



Wet tropospheric delays forecast based on Vienna Mapping Function time series analysis

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It is well known that the dry part of the zenith tropospheric delay (ZTD) is much easier to model than the wet part (ZTW). The aim of the research is applying stochastic modeling and prediction of ZTW using time series analysis tools. Application of time series analysis enables closer understanding of ZTW behavior as well as short-term prediction of future ZTW values. The ZTW data used for the studies were obtained from the GGOS service hold by Vienna technical University. The resolution of the data is six hours. ZTW for the years 2010 -2013 were adopted for the study. The International GNSS Service (IGS) permanent stations LAMA and GOPE, located in mid-latitudes, were admitted for the investigations. Initially the seasonal part was separated and modeled using periodic signals and frequency analysis. The prominent annual and semi-annual signals were removed using sines and cosines functions. The autocorrelation of the resulting signal is significant for several days (20-30 samples). The residuals of this fitting were further analyzed and modeled with ARIMA processes. For both the stations optimal ARMA processes based on several criterions were obtained. On this basis predicted ZTW values were computed for one day ahead, leaving the white process residuals. Accuracy of the prediction can be estimated at about 3 cm.